

Peterson 18

Serial No. 09/915,963

Claims ListingRECEIVED  
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OCT 18 2010

1 1. (Canceled)

1 2. (Canceled)

1 3. (Currently Amended) An antenna structure comprising:

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3 at least one antenna element, the at least one antenna element having at least one  
4 taper; and

5

6 a symmetrical finite ground plane coupled with the at least one antenna element;  
7 wherein said ground plane is separated from said at least one antenna  
8 element but is in sufficiently close proximity thereto to cause fast wave  
9 excitation thereof;

10

11 wherein the at least one antenna element comprises a traveling wave antenna supporting a  
12 phase velocity greater than the speed of light, and: wherein the taper comprises a linear  
13 profile, a linear constant profile, a broken-linear profile, an exponential profile, an  
14 exponential constant profile, a tangential profile, a step-constant profile, or a parabolic  
15 profile.

1 4. (Previously Presented) An antenna structure comprising:

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3 at least one antenna element, the at least one antenna element having at least one  
4 taper; and

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8 wherein the at least one antenna element comprises a traveling wave antenna supporting a  
9 phase velocity greater than the speed of light and, wherein the antenna structure supports  
10 a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional  
11 three-dimensional beam pattern.

1           5.       (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2 at least one antenna element is positioned at an angle from the symmetrical ground plane.

1           6.       (Original) The antenna structure of Claim 5, wherein the angle is about 90  
2 degrees with respect to the x-, y- and z- axes.

1           7.       (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2 at least one antenna element is coupled with the symmetrical ground plane by means of an  
3 unbalanced impedance.

1           8.       (Original) The antenna structure of Claim 7, wherein the unbalanced  
2 impedance comprises a coaxial cable.

1           9.       (Original) The antenna structure of Claim 7, wherein a first conductor of  
2 the unbalanced impedance mechanically couples the at least one antenna element with the  
3 symmetrical ground plane.

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1           **10.**   (Previously Presented) The antenna structure of Claims 3 or 4, wherein the  
2   symmetrical ground plane is disk shaped.

1           **11.**   (Canceled)

1           **12.**   (Canceled)

1           **13.**   (Currently Amended) An antenna structure comprising:  
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3       an array of at least two antenna elements, each antenna element having at least  
4       one taper;  
5  
6       a symmetrical finite ground plane; wherein said ground plane is separated  
7       from said at least two antenna elements but is in sufficiently close proximity  
8       thereto to cause fast wave excitation thereof; and  
9  
10       an unbalanced impedance for coupling the array of at least two antenna elements  
11       with the symmetrical ground plane;  
12  
13       wherein at least one antenna element of the array comprises a traveling wave antenna  
14       supporting a phase velocity greater than the speed of light and wherein the taper of at  
15       least one antenna element of the array comprises a linear profile, a linear constant profile,  
16       a broken-linear profile, an exponential profile, an exponential constant profile, a  
17       tangential profile, a step-constant profile, or a parabolic profile.

1           **14.**   (Currently Amended) An antenna structure comprising:

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an array of at least two antenna elements, each antenna element having at least one taper;

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a symmetrical finite ground plane; wherein said ground plane is separated from said at least two antenna elements but is in sufficiently close proximity thereto to cause fast wave excitation thereof; and

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an unbalanced impedance for coupling the array of at least two antenna elements with the symmetrical ground plane;

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wherein at least one antenna element of the array comprises a traveling wave antenna supporting a phase velocity greater than the speed of light and wherein each antenna element of the array supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional three-dimensional beam pattern.

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15. (Previously Presented) The antenna structure of Claims 13 or 14, wherein each antenna element of the array is positioned at an angle from the symmetrical ground plane.

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16. (Original) The antenna structure of Claim 15, wherein the angle for each antenna element is about 90 degrees with respect to the x-, y- and z- axes.

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17. (Previously Presented) The antenna structure of Claims 13 or 14, wherein the unbalanced impedance comprises a coaxial cable.

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1           **18.**     (Original) The antenna structure of Claim 17, wherein a first conductor of  
2     the unbalanced impedance mechanically couples each antenna element of the array with  
3     the symmetrical ground plane.

1           **19.**     (Previously Presented) The antenna structure of Claims 13 or 14, wherein  
2     the symmetrical ground plane is disk shaped.

1           **20.**     (Previously Presented) The antenna structure of Claims 13 or 14, further  
2     comprising a slow wave antenna to widen the directivity of the antenna structure.

1           **21.**     (Canceled)

1           **22.**     (Currently Amended) An apparatus comprising:  
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3     a transceiver; and  
4  
5     an antenna structure for radiating or capturing electromagnetic energy from or to  
6     the transceiver comprising:  
7  
8                 at least one antenna element having at least one taper, the taper comprising  
9                 a linear profile, a linear constant profile, a broken-linear profile, an  
10                exponential profile, an exponential constant profile, a tangential profile, a  
11                step-constant profile, or a parabolic profile;  
12  
13            a symmetrical disk shaped finite ground plane, the at least one antenna element  
14            being positioned at an angle from the symmetrical disk shaped finite ground plane;

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15 | plane; wherein said ground plane is separated from said at least one antenna  
16 | element but is in sufficiently close proximity thereto to cause fast wave  
17 | excitation thereof; and

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19 | an unbalanced impedance for coupling the at least one antenna element  
20 | with the symmetrical disk shaped finite ground plane;

21

22 | wherein the at least one antenna element comprises a traveling wave antenna supporting a  
23 | phase velocity greater than the speed of light and wherein the at least one antenna element  
24 | supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like  
25 | directional three- dimensional beam pattern.

1 | 23. (Previously Presented) The antenna structure of Claim 22, wherein the  
2 | angle is about 90 degrees with respect to the x-, y- and z- axes.

1 | 24. (Previously Presented) The antenna structure of Claim 22, wherein the  
2 | unbalanced impedance comprises a coaxial cable.

1 | 25. (Previously Presented) The antenna structure of Claim 22, wherein a first  
2 | conductor of the unbalanced impedance mechanically couples the at least one antenna  
3 | element with the symmetrical ground plane.

1 | 26. (New) The antenna structure of Claim 20, wherein said slow wave antenna  
2 | is positioned at a greater distance from said ground plane than said antenna elements.

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1           **27.**     (New) The antenna structure of Claim **3, 4 or 22**, wherein the distance  
2     between the lower edge of said at least one antenna element and said ground plane is  
3     tapered.

1           **28.**     (New) The antenna structure of Claim **13 or 14**, wherein the distance  
2     between the lower edge of each of said at least two antenna elements and said ground  
3     plane is tapered.